

WHAT IS CLAIMED IS:

1. An image processing apparatus comprising:
 - first signal generating means for generating a first signal on the basis of an input image signal;
 - 5 first memory means for storing a plurality of pattern data;
 - read-out means for reading out first and second patterns stored in the first memory means, in accordance with the first signal generated from the first signal generating means;
 - 10 third pattern producing means for producing a third pattern on the basis of the first and second patterns read out by the read-out means;
 - second signal generating means for generating a second signal on the basis of the image signal;
 - 15 second memory means for prestoring a fourth pattern;
 - fifth pattern generating means for generating a fifth pattern on the basis of the fourth pattern stored in the second memory means and the second signal generated from the second signal generating means;
 - 20 position calculation means for calculating an intra-pattern position signal indicative of a position within the patterns; and
 - 25 interpolation calculation means for calculating, in accordance with the intra-pattern position signal calculated by the position calculation means, an output

pixel value on the basis of a first pixel value within the first pattern corresponding to the intra-pattern position, a second pixel value within the third pattern corresponding to the intra-pattern position, and a
5 third pixel value within the fifth pattern corresponding to the intra-pattern position.

2. The image processing apparatus according to claim 1, wherein the first signal generating means is select signal generating means for generating a select
10 signal on the basis of the input image signal.

3. The image processing apparatus according to claim 2, wherein the select signal generating means assigns high-order bits of the input image signal to the select signal.

15 4. The image processing apparatus according to claim 1, wherein the first memory means is a pattern table that prestores a plurality of pattern data expressed by binary values with specified vertical and horizontal dimensions.

20 5. The image processing apparatus according to claim 1, wherein the third pattern producing means is difference pattern producing means for producing a difference pattern on the basis of the first and second patterns read out by the read-out means.

25 6. The image processing apparatus according to claim 5, wherein the difference pattern producing means produces a difference pattern $DF(xla, yla)$ according to

the equation,

$$\begin{aligned} &DF(xla, yla) \\ &= S[i](xla, yla) \text{ EXOR } S[i+1](xla, yla) \end{aligned}$$

where $S[i]$ is the first pattern, $S[i+1]$ is the second
5 pattern, and EXOR is Exclusive OR.

7. The image processing apparatus according to
claim 5, wherein the difference pattern producing means
is provided with a table prestoring a plurality of
difference patterns, and selects and outputs a
10 difference pattern in accordance with the select signal
generated by the select signal generating means.

8. The image processing apparatus according to
claim 1, wherein the second signal generating means is
interpolation signal generating means for generating an
15 interpolation signal on the basis of the image signal.

9. The image processing apparatus according to
claim 1, wherein the second memory means is an
interpolation order pattern table prestoring an
interpolation order pattern.

20 10. The image processing apparatus according to
claim 1, wherein the fifth pattern generating means is
interpolation pattern generating means for generating
an interpolation pattern on the basis of an
interpolation order pattern and an interpolation
25 signal.

11. The image processing apparatus according to
claim 10, wherein the interpolation pattern generating

means generates an interpolation pattern IP(xla, yla) according to the equation,

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    dj = (2^b)/(n*m) * P7L;  
    for(xla=0;xla<n;xla++){  
5        for(yla=0;yla<m;yla++){  
            if(dj>Od(xla,yla)){IP(xla,yla)=1;}  
            else{IP(xla,yla)=0;}  
        }  
    }
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10 where P7L is the interpolation signal, Od(xla, yla) is the interpolation order pattern, and b is a bit width which is one of 2, 3 and 4.

12. The image processing apparatus according to claim 1, wherein the position calculation means
15 calculates an intra-pattern position signal indicative of a position within the pattern on the basis of a main-scan sync signal and a sub-scan sync signal of the image signal.

13. The image processing apparatus according to
20 claim 1, wherein the interpolation order pattern stored in the second memory means has the same vertical/horizontal dimensions as the pattern stored in the first memory means.

14. The image processing apparatus according to
25 claim 1, wherein the position calculation means calculates an intra-pattern position on the basis of image coordinates (x, y) of the image signal according

to the following equation,

$$x_1 = (x+y/m*xds)\%n$$

$$y_1 = y\%m$$

where xds indicates a skew in a screen pattern main-scan direction.

15. The image processing apparatus according to claim 1, wherein the interpolation calculation means calculates an output pixel value according to the equation,

10
$$P_8 = S[i](x_1, y_1) \text{ EXOR } (DF(x_1, y_1) \text{ AND } IP(x_1, y_1))$$

where $S[i](x_1, y_1)$ is the first pixel value, $DF(x_1, y_1)$ is the second pixel value, $IP(x_1, y_1)$ is the third pixel value, and EXOR is Exclusive OR.

16. An image processing apparatus comprising:

15 select signal generating means for generating a select signal on the basis of an input image signal;

first memory means for prestoring a plurality of screen pattern data expressed by binary values with specified vertical/horizontal dimensions;

20 position calculation means for calculating an intra-pattern position signal indicative of a position within the screen pattern, on the basis of a main-scan sync signal and a sub-scan sync signal of the image signal;

25 read-out means for reading out first and second patterns stored in the first memory means, in accordance with the select signal generated from the

select signal generating means, and reading out a first pixel value within the first screen pattern corresponding to the intra-pattern position and a second pixel value within the second screen pattern

5 corresponding to the intra-pattern position;

interpolation signal generating means for generating an interpolation signal on the basis of the image signal;

10 second memory means for prestoring an interpolation order pattern;

output means for generating an interpolation pattern on the basis of the interpolation order pattern stored in the second memory means and the interpolation signal generated by the interpolation signal generating means, and outputting a binary interpolation pixel value in accordance with the intra-pattern position signal calculated by the position calculation means; and

15 interpolation calculation means for calculating an output pixel value by a logic operation on the basis of the first pixel value and second pixel value read out by the read-out means and the interpolation pixel value output from the output means.

20 17. The image processing apparatus according to claim 16, wherein the interpolation calculation means is:

((first pixel value) and (second pixel value)) or

((first pixel value) and (not(interpolation pixel value)) or

((not first pixel value) and (second pixel value) and (interpolation pixel value)).

- 5 18. An image processing method comprising:
- generating a first signal on the basis of an input image signal;
- prestoring a plurality of pattern data;
- reading out first and second patterns from the
- 10 prestored plurality of pattern data in accordance with the generated first signal;
- producing a third pattern on the basis of the read-out first and second patterns;
- generating a second signal on the basis of the
- 15 image signal;
- prestoring a fourth pattern;
- generating a fifth pattern on the basis of the prestored fourth pattern and the generated second signal;
- 20 calculating an intra-pattern position signal indicative of a position within the patterns; and
- calculating, in accordance with the calculated intra-pattern position signal, an output pixel value on the basis of a first pixel value within the first
- 25 pattern corresponding to the intra-pattern position, a second pixel value within the third pattern corresponding to the intra-pattern position, and a third

pixel value within the fifth pattern corresponding to the intra-pattern position.

19. The image processing method according to claim 18, wherein a table prestoring a plurality of difference patterns is provided, and a difference pattern is selected and output in accordance with the generated first signal.

20. The image processing method according to claim 18, further comprising reading out the first pixel value and second pixel value in accordance with the intra-pattern position signal relative to the first and second patterns, outputting an interpolation pixel value in accordance with the intra-pattern position signal relative to the fifth pattern, and calculating an output pixel value by a logic operation on the basis of the first pixel value, the second pixel value and the interpolation pixel value.